

# Animal and Bioscience Department

## Title

Multi breed genomic selection in dairy and beef cattle

## Abstract

Simulations, undertaken within-breed, suggest that genomic selection can increase genetic gain by >50%. However, interest in alternative dairy cattle breeds and crossbreeding is increasing, necessitating an across-breed genomic evaluation. Beef cattle breeding and sheep breeding are based on many different breeds and crossbreeds, which when coupled with their smaller population size, signify a requirement for across-breed genomic evaluations. This project will develop a one-step across-breed genomic selection pipeline which is close to implementation. The pipeline will be sufficiently generic to be exploitable also in other species (e.g., sheep). This project will focus on: 1) imputation, 2) genome-wide genomic predictions (including genome wide association analyses) and 3) breeding programs. All Irish researchers and the only two Irish institutes involved in genomic selection in Ireland are participants. The outcome from this study will be a national across-breed genomic selection breeding program for dairy and beef male and female cattle in Ireland putting Ireland to the fore internationally on genomic selection. The project will exploit and develop further international collaborations and will use resources already available. Increasing genetic gain by 50% expected from this project, is currently worth €5 million and €0.5 million annually to the dairy and beef industry, respectively, which is cumulative and permanent. Higher gains are achievable with a more optimal breeding scheme. Therefore this project is an extremely good return on investment – at least a 14 to 1 return on investment just in one year following completion of the study.

**Project Leader:** Donagh Berry

## Programme/Subprogramme/RMIS Number:

AGRIP - Moorepark Animal Biosciences-Genetic Improvement of Animals\_6408

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